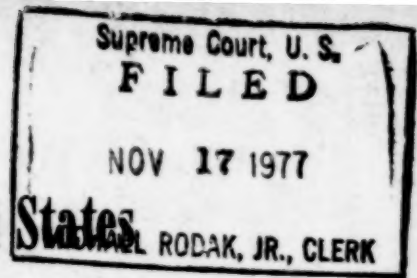


IN THE
Supreme Court of the United States



October Term, 1977
No. 77-271

ST. REGIS PAPER COMPANY,

Petitioner,

vs.

ROYAL INDUSTRIES AND PLAS-TIES SUBSIDIARY,

Respondents.

**Brief of Respondent Royal Industries in Opposition to
St. Regis Paper Company's Petition for Writ of
Certiorari to the United States Court of Appeals
for the Ninth Circuit.**

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Opinions Below.

The opinion of the Court of Appeals which affirmed the judgment of the District Court is reported at 522 F.2d 309 (9th Circuit 1977). The District Court's opinion is reported at 186 U.S.P.Q. 83 (C.D. Calif. 1974).

Royal Industries and Plas-Ties Subsidiary ("Royal") have filed a petition for a writ of certiorari, being October Term 1977, No. 77-279 in this same matter.

Counterstatement of the Questions Presented.

1. Whether a false oath which pertains to a claim that was disallowed by the Patent Office because it was within the prior art amounts to fraud in the solicitation of a patent?

2. Whether a patent having a single article or product claim and a number of method or process claims becomes invalid in toto because the court finds the product claim invalid for "obviousness" under 35 USC 103?

3. Whether *Lear, Inc. v. Adkins*, 395 U.S. 653 (1969) changes state law of restitution?

St. Regis takes interesting liberties with the record in this case. In its statement of the case, it asserts concerning its entering into the agreement "... which was entered into only upon specific assurances as to the validity of the patent . . ." This is utter nonsense. Royal did not make any warranties as to the validity of the patent. Indeed, the parties contracted with reference to the possible invalidity of the patent.

St. Regis was so desperate to acquire access to the Bower laminated plastic tie strip and to his method of producing it that it first offered to purchase the whole Plas-Ties operation from Royal at a substantial profit to Royal. Whether the Bower patent was valid or invalid was of no importance to St. Regis. If it could not buy the operation, it was more than delighted to enter into the licensing agreement in question. St. Regis had to find out how to make the Bower tie strip in a hurry, if it was to maintain its strong position in the bakery packaging field. It was just as anxious to get inside the Plas-Ties plant as it was to be able to use the patent, so much so that it had its production people from Ohio in the Plas-Ties production facility the day after the license agreement was signed.

St. Regis' present effort to make this case sound as if the essential element of the deal was the validity of the Bower patent is completely contrary to the undisputed facts in this case. As a matter of fact, St. Regis continued to pay Royal the full royalty payments due under the licensing agreement of May 1, 1963 for several months after this court's *Lear* decision, and of course, it continued to use both the Bower patent and Royal's know-how even after the license agreement expired.

The bottom line of this case, one which Royal repeatedly asserts and which St. Regis repeatedly ignores, is that St. Regis received everything that it bargained for in its deal with Royal, the use of the Bower patent and Royal's know-how for the full term of the license agreement.

REASONS WHY ST. REGIS' PETITION SHOULD BE DENIED.

1. The False Oath Was With Reference to a Claim Which Was Denied by the Patent Office as Covered by the Prior Art and Is, Therefore, Immaterial in This Case.

St. Regis made this same argument about the presumed consequences of the alleged false oath in both the District Court and the Court of Appeals. Each of those Courts rejected St. Regis' argument on this point.

The matter is further confused by the fact that the lower courts did not address themselves to the difference in subject matter between the Bower patent's single product, or article claim and the remaining claims which define the method of manufacturing that product.

This case involves, in part, the validity of United States Letters of Patent No. 2,767,113 to Gerald C. Bower and assigned by him to Royal Industries. A copy of this patent, now expired, is attached hereto as Appendix "A". This patent (the "Bower" patent) was issued as to both the product, a laminated plastic tie strip, and the method of manufacturing this product. A method or process of manufacture is an "art" capable of being patented, *Cochrane v. Deener*, 94 U.S. 787, 24 L.Ed. 139; *Gottschalk v. Benson*, 409 U.S. 63, 34 L.Ed.2d 273, 93 S.Ct. 253.

However, the Patent Office did not issue letters patent on all of the claims originally filed by Bower. For example, and most importantly on the issue of fraud that St. Regis is still trying to find some court to accept, Bower's original patent application included claims 1-4 each covering an article or product. The

Patent Office rejected claims 1-3 as being unpatentable over the prior art, specifically the Wisbrock patent, which was one of the eleven pieces of prior art which are identified on the last page of the Bower patent. Original patent application claim one referred to a laminated plastic tie strip that did not have a cementitious coating, as did the product covered by the Bower patent claim one as issued by the Patent Office.

It was St. Regis' position in the District Court that Bower had offered for sale the product covered by the patent more than one year prior to his filing his patent application. Bower testified that he had neither developed the product covered by the Bower patent nor the process for manufacturing that product during the critical time in question and that he had simply attempted to market on an experimental basis the plastic tie strip described in his original claim No. 1. *Cf. Austin v. Marco Dental Products Inc.*, Court of Appeals Ninth Circuit, September 12, 1977; *Amerio Contact Plate Freezers, Inc. v. Belt-Ice Corp.*, 316 F.2d 459, 137 U.S.P.Q. 282 (CA 9, 1963).

In this regard, the District Court expressly found that St. Regis "... failed to prove by a preponderance of the evidence that Bower's representations to the Patent Office were motivated by fraudulent intent. In the absence of such proof, plaintiff's argument of fraudulent procurement must fail." (Conclusion of Law No. 6.)

To support its contention, St. Regis offered in evidence a plastic tie strip of the type covered in Bower's original patent application claim No. 1, but not typical of the product as to which the patent (patent claim 1) ultimately issued. (Finding of Fact No. 15.) The District Court found that the fact that Bower had

falsely alleged that the product described in his original patent application claim one had not been offered for sale for more than one year prior to this filing of his application for letters patent tainted the entire patent application and invalidated the patent as to both the product and the method claims:

"17. The Bower patent has to be invalidated on two distinct grounds:

A. Bower's oath which accompanied his patent application was false. Bower signed and filed the prescribed oath when he filed his application for patent, saying in part that the product described and claimed in the application had not been in public use or on sale in the United States for more than one year prior to the filing date. This included the product described in original claim 1 of the application. Contrary to this representation, it is uncontested that such tie strips had been placed on sale and in public use and had been sold more than one year prior to the application. Findings Nos. 11-15, *supra*; Minute Order of March 31, 1971; Exhibit 2, pp. 8, 13." (Finding of Fact No. 17A.)

It is the position of the respondent to this petition that a false oath as to a claim that was disallowed by the Patent Office by virtue of the prior art is immaterial as that term was defined by the United States Court of Customs and Patent Appeals in *Norton v. Curtiss*, 433 F.2d 779. To be of any significance in a patent suit, a false oath should pertain to a claim as to which a patent issued.

The District Court also held the claims in the Bower patent invalid because of obviousness. (The Court of

Appeals affirmed the District Court on the basis that there was evidence to support the claim of obviousness and did not discuss the question of the false oath.)

In this regard, the decision of the lower courts is contrary to the teachings of this court in *Graham v. John Deere, Inc.*, 383 U.S. 1, at page 33.

St. Regis did dig up an expert, who, twenty years after the fact, testified that in 1952 it should have been obvious to anybody reasonably skilled in the art to add a cementitious bond to the laminated tie strip that was part of the prior art. However, this bit of testimony floats over the real facts of the matter as an evanescent cloud that one can see but cannot touch. Notwithstanding Dean Fischer's testimony, the fact is that nobody had ever invented a plastic tie strip of the type developed by Bower. One can be certain that, before coming out to California and trying to purchase an obscure, home-made operation in Orange County, mighty St. Regis must have addressed its legion of skilled mechanics to this problem for many months. What Dean Fischer said should have been obvious to anyone reasonably skilled in the art in 1952 was beyond the reach of St. Regis in 1963.

Since there is always one expert available to testify that the sum total of human experience should lead any competent mechanic to the claim allowed in any patent, the doctrine of *Graham v. John Deere, Inc.*, *supra* and the presumption described in 35 USC 282 may mean very little in a trial court, particularly where, as revealed by the file wrapper in this case, the Patent Office has extensively reviewed the prior art and disallowed three of the four product claims because of the prior art. (While allowing the method claims.)

When a District Court has before it the very same prior art facts as those reviewed by the Patent Office and holds a patent invalid, the function of the Patent Office is little more than a data collecting agency for the resulting litigation, which, in the Ninth Circuit at least, resembles a crap shoot for high rollers.

2. The Fact That a Product Claim Is Disallowed Because of "Obviousness" Should Not Ipso Facto Invalidate the Method Claims Covered by That Same Patent.

The findings of fact of the District Court have been very cleverly drafted by counsel for St. Regis. For example, Finding of Fact No. 16 is a finding that the product covered by the Bower patent was placed on sale for more than one year before the patent application was filed. However, notwithstanding the elaborate summary of the circumstantial evidence in this finding, it is obviously a delicate little thing because it does not serve any function in the judgment other than to take up space. The District Court very carefully did not invalidate the Bower patent because of the prior sale of the patented article, but rather relied upon the prior sale of the unpatentable tie strip, *cf.* Finding No. 17A. Finding of Fact No. 17, which is supposedly a finding on a crucial issue in the case is a *non sequitur*. Apparently the Court of Appeals recognized this oddity because it confined its limited discussion on the validity of the patent to the obviousness point.

However, all of this has nothing to do with the method claims that were allowed by the Patent Office. There is no finding of fact at all by the District Court to establish that Bower had perfected the *method* described in his original patent application more than

one year prior to filing his patent application. The only evidence in the record on this issue was Bower's testimony to the effect that he was still experimenting with, tinkering with and improving his method for making the tie strip until just shortly before Mr. Steadman B. Hoar, his patent agent, prepared and filed the application in question.

Again, the versatile Dean Fischer volunteered that, not only the product but the process claimed in the Bower patent would have been obvious to one of ordinary skill in the art. (Finding of Fact No. 18.) However, this optimistic testimony flies in the face of the fact that, until Mr. Bower came along, nobody had ever developed a method by which the wire in the plastic tie strip became itself bonded to the plastic ribbons from which the tie strip is made. If it was obvious, St. Regis would have figured out how to do it. The fact is, that, even to this date, nobody except Gerald Bower developed a method for manufacturing the tie strip and St. Regis is still using this very same method today, four years after the license has expired.

However, the District Court invalidated the method claims not only because of obviousness, but also because of Bower's false oath concerning the prior sale of the unpatentable tie strip. (Finding of Fact 12A, Conclusion of Law No. 2.) It is the respondent's position that this holding is incorrect. Each claim of a patent is presumed valid *independently* of the validity of other claims. 35 USC 282. Therefore, the fact that there may have been a false oath concerning a claim that was disallowed by the Patent Office has no bearing on the validity of the other claims as to which a patent issued.

3. *Lear v. Adkins*, 395 U.S. 653 (1969) Does Not Change State Law of Restitution.

Much of St. Regis' lament is that the District Court did not order Royal to remit the royalties paid by it to Royal before it stopped paying the royalties called for in the license agreement. St. Regis asserts that it is wrong to permit "... a patentee who procured his patent by filing before the patent office a knowingly false oath to retain royalties paid pursuant to the invalid patent issued thereon". Unfortunately for St. Regis, this is not this case. Royal did not warrant the validity of the Bower patent.* What St. Regis prefers to disregard is that the parties contracted with reference to the possible invalidity of the Bower patent.

Furthermore, the question of the validity of the Bower patent was so unimportant to St. Regis that all it requested was the option to terminate the license agreement in six months notice after a final judgment of invalidity had become final.

St. Regis received everything that it bargained for in the license agreement. It had the use of the Bower

*The skill of the drafter of the District Court's findings is again manifest on this issue. Finding of Fact No. 22 referring to the negotiations leading to the license agreement states in part "... plaintiff's negotiations requested assurances of the validity of the Bower patent prior to proceeding". Not only is this finding contrary to the undisputed evidence at the trial (Note, there is no reference to the trial transcript for this statement), but what is most important, there is no finding at all that Royal gave any such assurances to St. Regis).

To the contrary, St. Regis' counsel obtained from Royal the file wrapper and independently reviewed it prior to the negotiations that resulted in the Agreement in issue. St. Regis' prior counsel must have concluded it was valid.

patent and of Royal's know-how for the full term of the license agreement. The happenstance that this Court rendered its decision in *Lear, Inc. v. Adkins*, *supra*, after the parties had entered into the license agreement was used by St. Regis as an excuse for the non-payment of the royalties called for in the license agreement. The license agreement and the Bower patent expired before any final judgment of invalidity was rendered by the courts.

The only reason that the District Court did not enforce St. Regis' contractual obligation to pay royalties as called for by the license agreement was this court's intervening decision in *Lear v. Adkins*, *supra*, and because it chose to place a lump sum valuation on Royal's know-how. (Findings of Fact Nos. 28, 29 and 30.)

It held that St. Regis was not entitled to a refund of the royalties paid by it prior to its instituting this litigation on the authority of *Troxel Mfg. Co. v. Schwinn Bicycle Co.*, 465 F.2d 1253 (6th Cir. 1972). (Conclusion of Law No. 5.)

It is true that the District Court held that St. Regis was entitled to rescind the license agreement because of the invalidity of the Bower patent. (Conclusion of Law No. 4.) However, this ruling overlooked the fact that St. Regis continued to use Royal's know-how for the duration of the license agreement. Therefore, although the District Court held that St. Regis could rescind the license agreement, nothing happened. St. Regis continued to manufacture the laminated tie

strips using both the method described in the Bower patent and Royal's know-how for the duration of the term of the license agreement. However, because the District Court by a process of judicial transsubstantiation had converted the royalty agreement for the know-how into a lump sum contract, St. Regis was permitted to use Royal's know-how for seven years without any compensation to Royal. In short, while the court decreed rescission, nothing happened except that St. Regis stopped paying.

Furthermore, St. Regis' claim that the District Court misapplied the California law of rescission is incorrect. As the Court of Appeals noted, under California law, restitution is discretionary. The last sentence of California Code of Civil Procedure section 1692 states: "If in an action or proceeding a party seeks relief based upon rescission, the Court *may* require the party to whom such relief is granted to make any compensation to the other which justice requires and *may* otherwise in its judgment adjust the equities between the parties" (emphasis added). The California Courts have held that this code section empowers the court ". . . to adjust the equities between the parties and grant such relief as will achieve substantial justice under the circumstances of the case presented to it." *Snelson v. Ondulando Highlands Corp.*, (1970) 5 Cal.App.3d 243 at page 258.

Conclusion.

St. Regis' petition for certiorari does not tender any important issues of federal law which require a determination by this court nor does it claim that there is any conflict in the Courts of Appeal which needs a resolution.

St. Regis has already gotten more than it is entitled to in this case. Both the District Court and the Court of Appeals have rejected its claim that it is entitled to more. St. Regis has failed to advance any compelling argument as to why these judgments should be overturned.

Respectfully submitted,

ROBERT M. NEWELL,
*Attorney for Respondent Royal Industries
and Plas-Ties Subsidiary.*

Of Counsel:

EDWARD J. DARIN.

APPENDIX A.

Oct. 16, 1956

G. C. BOWER

2,767,113

PLANT-TIES AND METHOD OF MANUFACTURE

Filed June 2, 1952

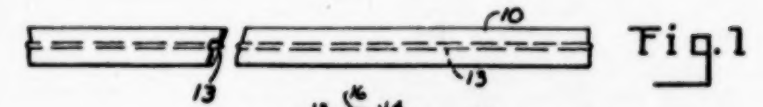


Fig. 1



Fig. 2

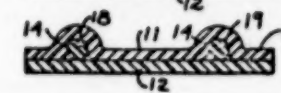


Fig. 3

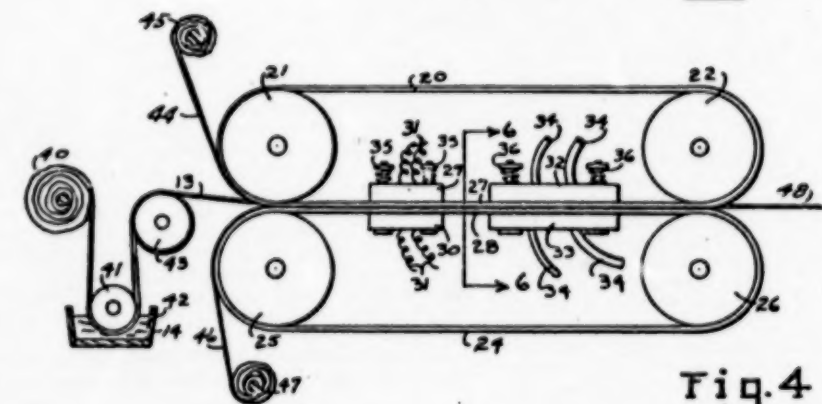


Fig. 4



Fig. 5

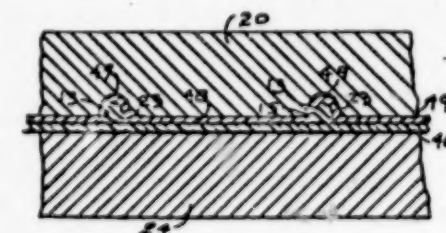


Fig. 6

INVENTOR
Gerald E. Bower
BY
Hedman B. Hoar
Agent

1

2,767,113

PLANT-TIES AND METHOD OF MANUFACTURE

Gerald C. Bower, Santa Ana, Calif.

Application June 2, 1952, Serial No. 291,273

8 Claims. (Cl. 154-93)

This invention relates to ties for plants and to a method of manufacturing the same, and more particularly relates to a plant tie having a wire reinforcement in a waterproof tie-strip and a method of effecting a lasting bond between the wire and the strip.

For some years, plant ties have been commercially available that have a wire reinforcement in a paper casing. It will be appreciated, however, that a plant tie, used in a garden or in general agriculture, is subject to all conditions of weather, and when used to tie bunches of vegetables or cut flowers, it is subject to wetting and to refrigeration and other stratagems for keeping the flowers or vegetables in fresh and marketable condition. It is desirable that the materials of a plant tie should be resistant to sun-light, heat, cold, and intensive wetting. It is furthermore desirable that the wire, which permits fastening the tie by merely twisting it, and the outer casing or ribbon which facilitates handling and prevents the wire from cutting the stems or stalks, should be bonded together so that the casing or ribbon cannot slide from, or tear from or bunch up on the wire. No plant tie having all these desired qualities and yet economical to manufacture has appeared to my knowledge prior to my present invention.

It is an object of this invention to provide a plant tie which has an imbedded wire by which it may be twisted, and an outer casing of material resistant to sunlight, heat, cold, and wetting.

A further object of this invention is to provide a plant tie so bonded that its casing and wire will not become separated, to the injury of plants and to the inconvenience, and possible injury to the fingers, of the person using it.

Another object of this invention is to provide a plant-tie so formed that printed matter thereon will be undistorted after the tie has been formed.

Another object of this invention is to provide an economical and efficient method of manufacturing a plant tie of the above-enumerated qualities.

Other advantages inherent in my invention will be pointed out as this specification proceeds, or will be apparent from the following description considered together with the accompanying drawing, in which:

Fig. 1 is a plan view of a plant tie illustrative of my invention;

Fig. 2 is a cross-sectional view on an enlarged scale of the tie shown in Fig. 1.

Fig. 3 is a cross-sectional view of a modified form of plant-tie;

Fig. 4 is a schematic view of apparatus for manufacturing my improved plant tie;

Fig. 5 is a plan view of a belt forming a part of said apparatus; and

Fig. 6 is a cross sectional view, on an enlarged scale, showing how the belt of Fig. 5 is used in forming plant-ties.

Having reference now to the details of the drawing, I have shown in Figs. 1 and 2 a plant tie 10 formed of two strips or ribbons 11 and 12 of water-resistant plastic ma-

2

terial and a wire 13 held between the ribbons. As material for the ribbons 11 and 12 I prefer to use polyvinyl chloride, this material being highly resistant to sunlight as well as to water and being thermoplastic so as to soften at high temperature and then being capable of uniting under pressure, one piece of polyvinyl chloride to another, as if welded. However, polyvinyl chloride in sheet or ribbon form does not readily adhere to metal, and to cause the ribbons 11 and 12 to adhere to the wire 13, I give the wire a coating 14 of a thermoplastic bonding or cementitious material, such as a lacquer of polyvinyl chloride made quick-drying by addition of ethyl alcohol, and then treat the ribbons in accordance with the hereinafter described steps of my process. It is quite important that the lacquer 14 be quick-drying, as aforesaid, in order that it may be substantially dry before being brought into contact with the ribbons 11 and 12. Of course various drying means well known in the art, such as hot-air blasts, may be used to expedite the drying. If wires covered with still-wet lacquer are brought into contact with ribbons of the same chemical nature, the ribbons may be dissolved sufficiently to weaken them before the subsequent steps, hereinafter detailed, can be applied to preserve them. Also, I have found that even under heat and pressure it is not always possible to bond the ribbons 11 and 12 together, particularly if the wire 13 is so placed between the ribbons that the ribbons are held apart by the wire, as such separation makes it difficult to force the ribbon surfaces together with adequate pressure and may even leave very minute air bubbles between the ribbons which will later cause the ribbons to separate when the plant-tie is rolled or twisted. I therefore imbed the wire 13 in one of the ribbons—say, the ribbon 11—in such a manner that it deforms the ribbon 11, forming a channel 15 on one side of the wire of a depth equal to the diameter of the wire and a ridge 16 on the outer side of the ribbon 11, while the other ribbon 12 is left flat and just tangent to the wire. Besides permitting the two ribbons to be pressed together right to the sides of the wire, instead of leaving an elongated eye-shaped cavity with the wire at its center, this construction permits the ribbon 11 to engage tightly at least 180 degrees of the periphery of the wire, and as hereinafter explained more often close to 270° of the periphery. Thus the wire 13 is bonded to the ribbon 11 and thereby to the plant-tie as a whole much more firmly than if each of the ribbons 11 and 12 made contact with peripheral angles of 60 to 90 degrees of the wire.

In Fig. 3 I have shown a modified form of plant-tie 17 in which two wires 18 and 19 are held between the plastic ribbons 11 and 12, and adjacent the lateral margins of the plant-tie. Two wires so placed make a very strong tie which tends to remain flat and not to curl or fold; conversely, the force required to twist the tie applies considerably more torsion to the individual wires and tends to break them from their bond with the plastic ribbons. The bond provided by deforming the ribbon 11 so as to very largely surround the wire 13 and not deforming the strip 12 at all becomes a practical necessity with a plural-wire plant tie. The wires 18 and 19 are both imbedded in the ribbon 11, with the ribbon 12 merely tangent to the wires, and are cemented in their channels in the ribbon 11 by the cementitious coating 14.

In carrying out my method of manufacturing the plant-ties 10 and 17, I make use of the apparatus shown schematically in Fig. 4, and in more detail in Figs. 5 and 6. A steel belt 20 is mounted on pulleys 21 and 22 and has a plurality of longitudinal grooves 23 in its outer side. A second steel belt 24, having flat sides, is mounted on pulleys 25 and 26 so as to ride in contact with the belt 20. The belts 20 and 24 are driven at equal speeds from a suitable power source, not shown. The juxtaposed

strands 27 and 28 of the belts 20 and 24 run between heating boxes 29 and 30, which may be heated electrically through wires 31, and between refrigerating boxes 32 and 33, to which a liquid refrigerant may be conducted through pipes 34. Springs 35 hold the box 29 under pressure against the belt strands 27 and 28, against the resistance of the box 30, and likewise springs 36 act upon the box 32 and the belt strands against the resistance of the box 33.

Wires 13 run from spools 40 around spindles 41 in a bath 42 of the quick-drying lacquer 14 and thence over guide spindles 43 into the nip of the belts 20 and 24 in individual alignment with the grooves 23. Although for diagrammatic purposes, only one wire 13 is shown in Fig. 4, it will be understood that there may be as many wires as there are grooves 23 in the belt 20 to receive the wires. A strip 44 of polyvinyl chloride, substantially corresponding in width to the belts 20 and 24, is fed from a spool 45 into the nip of the belts between the wires 13 and the grooved belt 20. A similar strip 46 is fed from a spool 47 into the nip of the belts between the wires 13 and the flat-surfaced belt 24. The strips 44 and 46, with the enclosed wires 13, form the wide band or ribbon 48, as shown in Figs. 4 and 6, which when subsequently sliced lengthwise forms the plant-ties 10 or 17.

The pressure of the flat-surfaced belt 24 forces the wires 13 into the grooves 23 of the belt 20. Each of the wires 13 deforms the strip 44 by forcing the strip into the grooves 23, to form the channels 15 and ridges 16. The width of each groove 23 is therefor selected to be the sum of the diameter of a wire and two thicknesses of the strip 44. Theoretically, in order to bring the wires 13 just tangent to the surface of the belt 24, the depth of the grooves should be the diameter of the wire, but I have found a slight amount of extra depth to be desirable, about one thickness of the strip 44. This may amount to only about three one-thousands of an inch but apparently provides a pocket to receive any excess material resulting from variations in the thickness of the strip, the diameter of the wire, and the lacquer coating 14, and may provide an air-cushion. Whatever be the reason for it I have found that without this slight extra depth, shown in Fig. 6 as the space 49, there is a tendency for the wires to extrude beyond the uncreased surface of the strip 44 and so to press against the strip 46, decreasing both the area of contact of the strip 44 with the wires and the area of contact of the strip 44 with the strip 46.

As the band 48 proceeds from the point of nip of the belts 20 and 24, contained between the belt strands 27 and 28, it passes between the heating boxes 29 and 30. The heat from these boxes, which hold the belts under pressure of the springs 35 is rapidly transmitted through the metal belts. The effect of the heat and pressure is to flow the plastic strips 44 and 46 together by softening the plastic material of the strips 44 and 46 and also to cause the softened material of the strip 44 to flow around the wires 13. Thus the strip 44 is caused to encompass much more than a peripheral angle of 180 degrees of the wire 13. As it is forced into the corners between the wires 13 and the flat strip 46 it may encompass over 270 degrees of arc on the wires. The application of heat and pressure is also an important preliminary step in preparing the strips and the thermoplastic coating 14 for subsequent "setting" in a strong bond by flowing together the similar thermoplastic materials. The application of heat not only softens the plastic strips 44 and 46, but also softens the dried coating of lacquer on the wires 13.

The belts 20 and 24 then convey the band 48 to the refrigerating boxes 32 and 33, where the metal belts and the contained ribbon are rapidly chilled, while receiving the pressure of the springs 36. The effect of the cold and pressure is to set the thermoplastic material of the strips 44 and 46 and the coating 14 in a strong bond between the strips 44 and 46 and between the strips and the wires 13.

I have found that if the band 48 is allowed to travel even a very short distance in an unsupported and unconfined state between heating and refrigerating units—for example, to travel in the open between heated and chilled rollers—there is a tendency for the heated material to crawl and even to separate. A wavy band, with pockets of air or gas, may result. With the band confined between the heated belts 20 and 24, there is little reduction in the temperature of the band as it travels from the boxes 29 and 30 to the boxes 32 and 33, and the effect of the boxes 32 and 33 is to produce a sudden and large temperature reduction, somewhat in the nature of, but not to the extent of, quick-freezing; and little or no gas formation is found in the product. The confinement and support afforded by the belts 20 and 24 to the band 48 also prevents the heated material from crawling and causing a wavy product. In this connection, the confinement of the wires 13 in the grooves 23 until the entire treatment is completed greatly assists in preventing the adjacent thermoplastic material from moving laterally.

When the now-unified and bonded band 48 emerges from between the belts 20 and 24 it may be sliced lengthwise in ribbons having either one wire, as in the plant-tie 10, or having a plurality of wires as in the plant-tie 17. The long ribbons may then be wound on spools or cut into lengths appropriate for individual plant-ties.

Not only does my method produce a plant-tie of great endurance and weather-proof qualities, which not even the torsion of twisting two parallel wires will easily break up, but it produces a plant-tie which may carry printing and advertising matter with superior legibility. The undeformed strips 46 may be printed in advance, and the printing will appear on a plane undeformed surface on the resultant plant-ties.

I wish it understood that many descriptive details in the foregoing specification are presented only as examples of my novel plant-tie and method of manufacture and may be varied and modified within the scope of the appended claims without departure from the spirit of my invention.

I claim:

1. A plant-tie comprising: two ribbons of polyvinyl chloride joined face to face in parallel to form a unified strip; a wire disposed between said ribbons lengthwise thereof; one of said ribbons being flat and the other of said ribbons having a channel at least as deep as the diameter of said wire, in which said wire is embedded; and a cementitious coating on said wire for bonding said wire to said ribbons.

2. The method of manufacturing a water-proof plant-tie which consists in: coating a wire with a cementitious material; disposing said wire between two strips of polyvinyl chloride; pressing said strips upon said wire so as to cause said wire to become embedded in only one of said strips, the other strip remaining substantially tangent to said wire, and continuously moving the band thus formed by said strips and said wire under pressure through the following steps; indirectly heat-treating said band, the heat being applied to and through pressure-producing elements; and indirectly cold-treating said band, the cold being applied to and through pressure-producing elements.

3. The method of manufacturing a water-proof plant-tie which consists in: coating a wire with a lacquer of the same family of resins as the hereinafter mentioned strips, said lacquer containing a volatile solvent; disposing said coated wire between two strips of polyvinyl chloride; forcing said wire into one of said strips so as to leave the other of said strips flat and said wire merely tangent thereto; heat-treating under pressure the band formed by said strips and said wire to cause said strips to adhere together and to said wire; and cold-treating said band under pressure to complete the bond between said strips and between said strips and said wire.

4. The method of manufacturing a water-proof plant-tie which consists in: coating a wire with polyvinyl chlo-

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ride; disposing said coated wire between two strips of polyvinyl chloride; forcing said wire into one of said strips so as to leave the other of said strips flat and said wire merely tangent thereto; heat-treating under pressure the band formed by said strips and said wire to cause said strips to adhere together and to said wire; and cold-treating said band under pressure to complete the bond between said strips and between said strips and said wire.

5. The method of manufacturing a water-proof plant-tie which consists in: coating a wire with cementitious material disposing said wire between two strips of polyvinyl chloride and pressing said strips together to cause said wire to embed therein; and heat-treating and then cold-treating the band formed by said strips and said coated wire, said treatment being conducted under pressure. The method of manufacturing a plant-tie which consists in: coating a wire with cementitious material; disposing said wire between two ribbons of thermoplastic material, and pressing said ribbons together, to cause said wire to embed in one of said ribbons, said wire then producing a ridge on the outer side of said one ribbon; heating the band formed by said ribbons and said wire; pressing said ribbons to one another and to said wire to cause the heated material thereof to adhere together; cooling said band to cause the adhering materials thereof to bond together; and restricting lateral movement of said ridge and the contained wire continuously while said band is in heated condition.

7. The method of manufacturing a plant-tie which consists in: coating a wire with cementitious material; disposing said wire between two ribbons of thermoplastic material and pressing said ribbons together to cause said wire to embed therein; heat-treating the band formed by

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said ribbons and said coated wire, and pressing said ribbons together to cause the heated material thereof to adhere one ribbon to the other and to flow around and to adhere to said coated wire; maintaining said band temporarily in substantially fully heated condition; and then suddenly and rapidly cooling said band.

8. The method of manufacturing a plant-tie which consists in: coating a wire with cementitious material; disposing said wire between two ribbons of thermoplastic material and pressing said ribbons together to cause said wire to embed therein; heat-treating the band formed by said ribbons and said coated wire, and pressing said ribbons together to cause the heated material thereof to adhere one ribbon to the other and to flow around and to adhere to said coated wire; maintaining said band temporarily in substantially fully heated condition; and then suddenly and rapidly cooling said band under pressure.

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